REMARKS

This responds to the Office Action dated March 11, 2003, applicant thanks the Examiner for withdrawing the previously made oral restriction requirement and respectfully requests reconsideration of the application in view of the above amendments and the following remarks.

Claims 8-18 are pending in this application. Original claims 1-7 have been cancelled. New claims 8-18 have been added to define the present invention in a more accurate fashion. Among these new claims, claims 8, 17 and 18 are independent. Claims 9-16 depend from claim 8. Independent claims 8, 17 and 18 recite method and systems for generating a vertical magnetic field in an air gap for ferrohydrostatic separation by using one or more magnets, wherein the density of the vertical magnetic field is controller by adjusting the dimensions (and configurations) of the magnets without changing the air gap. Claims 9-16 further define the invention. Support for these claims can be found, for example, at page 6, lines 22-29 and page 7 line 14-- page 8 line 8 of the specification. No new matter has been added.

"Brief Description of Drawings" has been inserted

In section 1 of the Office Action, the disclosure was objected to as lacking a section entitled "Brief Description of Drawings". Accordingly, applicant has inserted the section and this objection is therefore believed moot because of the insertion.

Claim objections are moot due to the cancellation of original claims

In section 2 of the Office Action, original claims 1-7 were objected to as being in improper form. In response to this objection, applicant has canceled original claims 1-7 and

added new claims 8-18 to define the invention more accurately. These claim objections are therefore moot due to the claim cancellations.

Figure 1 has been designated as "prior art"

In section 3 of the Office Action, Figure 1 was objected to as not being designated as prior art. Accordingly, applicant has inserted a "Prior Art" legend into Figure 1 to designate it as a figure illustrating prior art. This objection is therefore believed moot in view of applicant's amendment of Figure 1.

35 U.S.C § 112 rejections were moot

In section 4 of the Office Action, claims 1-5 and 7 were rejected under 35 U.S.C. § 112 as being indefinite. These rejection are also moot due to the cancellation of claims 1-7. It is further respectfully submitted that new claims 8-18 satisfy section 112 since, as explained above, these claims particularly point out the invention.

New claims 8-18 distinguish patentably from the references cited in 35 U.S.C § 102 (b) rejections

In section 5 of the Office Action, claims 1, 2, and 4-7 were rejected under 35 U.S.C. § 102 (b) as being anticipated by a number of references. These references are U.S. patent #3,898,156 to Kaiser et al. ("Kaiser"), U.S. patent #4,052,297 to Mir ('Mir"), U.S. patent #4,062,765 to Fay et al. ("Fay"), and U.S. patent 3,788,465 to Reimers et al. ("Reimers"). These rejections are moot due to the cancellation of claims 1-7. It is further respectively submitted that pending independent claims 8, 17 and 18 distinguish patentably from these references for at least the following reasons.

Kaiser discloses a magnet comprising a yoke with hyperbolic pole pieces attached to the poles of the yoke in a symmetric fashion and an adjustable mirror plate separated from the poles for tuning the magnetic field between the poles. See, e.g., Figure 2 and col. 4, ln 17--ln 35 and col. 5 ln 22--col. 6, ln 10 of the specification. Although Kaiser teaches adjusting the position of the mirror plate to change the magnetic field, it does not teach, disclose, or even suggest adjusting the dimensions of the magnet based on a density estimation without changing the air gap.

Mir discloses a method and system for adjusting the height of the ferrofluid column in a ferrofluid separator by controlling the location of the access openings into the column of ferrofluid so that the opening is on a pre-determined air-ferrofluid interface to support a specific height of a ferrofluid column. See, e.g., Figure 3 and col. 3, ln. 25--col. 4, ln. 38 of the specification. Mir, as well, does not teach, disclose, or even suggest adjusting the dimensions of the magnet based on a density estimation without changing the air gap.

Fray discloses an apparatus for separating materials of different densities comprising magnets for generating a magnetic field to control the density of the ferrofluid in order to separate materials of different density. See, e.g., Figure 1a, Figure 1b and col. 6. ln. 43--col. 7, ln. 18 of the specification. Fray also discloses using a grid of U-shaped electrical conducting segments to generate a desired magnetic field. See, e.g., Figure 3 and col. 7, ln. 19--ln. 49 of the specification. Fray, still, does not teach, disclose, or even suggest adjusting the dimensions of the magnet based on a density estimation without changing the air gap.

Reimers discloses a method for separating materials of different densities comprising the steps of passing a mixture of materials having different densities through a volume of magnetic fluid and collecting fractions of the materials of different densities as they emerge from the fluid. The volume of magnetic fluid is subject to a non-uniform magnetic field so

that different materials traverse the fluid in a different trajectory. See, e.g., Figure 3 and col. 6, ln 2--col. 7 ln. 19 of the specification. Reimers, like Kaiser, Mir and Fray, still does not teach, disclose, or even suggest adjusting the dimensions of the magnet based on a density estimation without changing the air gap.

By contrast, pending independent claim 8 expressly requires adjusting the dimensions of the magnet based on a density estimation without changing the air gap. Pending independent claims 17 and 18 expressly require adjusting the dimensions and configurations of the magnet based on a density estimation without changing the air gap. Accordingly, it is respectfully submitted that pending independent claims 8, 17 and 18 distinguish patentably from Kaiser, Mir, Fray and Reimers.

Pending claims 9-16 depend from claim 8, these claims are also believed patentable for the same reason above associated with claim 8.

New claims 8-18 distinguish patentably from the reference cited in the 35 U.S.C. § 103 (a) rejection

In section 6 of the Office Action, claims 1, 3, 6 and 7 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over U.S. patent #4,085,037 to Quets et al. ("Quets") in view of what is well known in the art. This rejection is moot following the cancellation of claims 1-7. It is further respectfully submitted that pending claims 8-18 distinguish patentably from Quets for at least the following reasons.

Quets discloses using a single magnet or a split pair of magnets to generate magnetic fields for ferrohydrodynamic particle separation, wherein these magnets are arranged into different placements with different air gaps to cop with different material separations. See, e.g., Figure 1a--1c and col. 6, ln. 19--ln. 26 of the specification. Quets does not teach,

disclose, or even suggest adjusting the dimensions of the magnet based on a density estimation without changing the air gap.

It is therefore respectfully submitted that pending independent claims 8, 17 and 18 distinguish patentably from Quets since these claims expressly require adjusting the dimensions of the magnet based on a density estimation without changing the air gap.

Pending claims 9-16 depend from claim 8, these claims are also believed patentable for the same reason above associated with claim 8.

CONCLUSION

In light of the above, it is respectfully submitted that the present application is in condition for allowance. Favorable disposition is respectfully requested. Should the Examiner have any questions or comments concerning this submission, or any aspect of the application, the Examiner is respectfully invited to call the undersigned at the phone number listed below.

No fee is believed due at this time. Should any fees be required, please charge such fees to Pennie & Edmonds LLP Account No. 16-1150.

Respectfully submitted,

Dated: 6/11/2003

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